

# **A STUDY ON SENIOR DRIVER'S PROBLEM IN REGIONAL CITY**

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## **ABSTRACT**

Japan becomes an aging society. Therefore number of senior driver is increasing. But driving by senior people is not always safe. The risk of driving by senior people is one of the social problems in Japan. In this study, authors researched senior driver's environment and driving in regional city by questionnaire survey. 486 respondents of senior driver and 415 of his families answered the questionnaire.

As a result, it was found that seniors drove vehicles frequently. Most of seniors felt decline of own ability. They drove with pleasure but imagined stop driving in future. About 20% met accident in last five years. Very few people wanted to drive a car after 90 years old. But about 60% of driver felt anxiety of life after retirement of driving. Main alternative transportation after retirement of driving was bus transportation. However most of respondent felt dissatisfaction about bus service.

## **1. INTRODUCTION**

Senior driver is increasing year by year in Japan according to growing population of seniors. However, number of accident caused by senior driver also increasing. In general, driving ability of senior people goes down because of aging. According to previous studies, senior driver loses function necessary for driving. Senior driver is good at simple driving operation, but not good at complicated operation such as merging, turning right, crossing street. In fact death rate of accident involving senior people is 1.5 times higher than younger people [1]. Therefore driving by senior people is not safer than younger.

Police authority started aptitude test for driver whose age is over seventy when he renew driver's license, and recommends senior driver to abandon driving license if he is not able to drive a car safely. But very few people do so. Two reasons are considered. One is poor alternative transportation condition around him especially in regional area, where service level of public transportation is low. Second is overconfident of senior driver. Previous studies also show that senior driver is confident for his driving even though he does not drive a car safely.

Considering these background, situation and consciousness about driving of senior driver in regional city were researched.

## **2. PREVIOUS RESEARCH REVIEW**

Senior driver will face difficulty when he lost ability of driving. Foley and others researched that there were gaps between life expectancy and driving retirement age [2]. They were 6 years for male and 11 years for female in United States. On the other hand, accident by senior driver has been increasing because not only number of senior driver is increasing, but also high accident rate of seniors. Nishida found that senior driver's accident rate (per kilometer vehicle) is higher than middle age (35-60) driver [3]. Ability of driving will decrease as the driver gets old because of aging.

As for fatal accident, a type of violation of law was analyzed. According to the result, senior driver violation share at halt was bigger than younger driver [4].

Okamoto and others found that senior driver was especially weak at the driving when complex operation and judgment is necessary [5]. Therefore senior driver tends to make accident at intersection, where complex driving operation is necessary.

Hasuhana found that senior driver was over confident about his driving skill [6]. He conducted comparison of driving skill evaluation by senior driver himself and by a driving school teacher when senior driver drove a car in a test course. He found that senior driver's self evaluation was always higher than driving school teacher.

Rotter found that accident by senior driver often occurred in daytime of sunny day or on local road in New Jersey states [7]. She speculated that senior driver avoid night time drive or drive on arterial road which he may felt dangerous.

## **3. RESEARCH METHOD**

Morioka city was selected for study field. Morioka with population of about 300,000 is capital of Iwate prefecture in northern part of Japan. There are good bus services in central of the city, but poor services in suburb areas.

A questionnaire survey was conducted in November in 2008. Target respondents were people with driver's license whose age is about sixty five or more, and family who lived with the driver. A questionnaire and answer sheet was distributed to home through news paper delivery system. Answer sheet was returned through mail. 5,100 questionnaire answer sheets were distributed. As a result, 486 answers from senior drivers, and 415 from their families were returned. Return rate was 9.5% and 8.1% respectively. The rate seems to be rather low, because not all homes had senior driver. Considering the rate of senior household and rate of driver's license holder over 65, substantial return rate was considered to be almost 70%.

In the questionnaire, present driving, evaluation of own driving, will of stop driving in future, accident record, decline of physical ability, weak point of driving were asked for senior driver. For family, almost

same question were asked for comparison. In this paper, mainly result of senior driver was described.

#### 4. RESULT OF QUESTIONNAIRE

##### (1) Attribution

82.3% respondent was male. Because there were few women driver in senior people in Japan. About the age range, 65 to 69 is 40.0%, 70 to 79 is 41.3%, 80 or more is 11.7% (Figure 1). It is remarkable that there were not a few senior driver with age of eighty years old or more. 78.3% respondents live with spouse, and there were only 4.1% of solitude. 57.5% respondents were unemployed, 13.9% were self employed business owner. About driving experience, about 60% of respondent had more than 40 years driving experience. Therefore most of them had long driving experience.

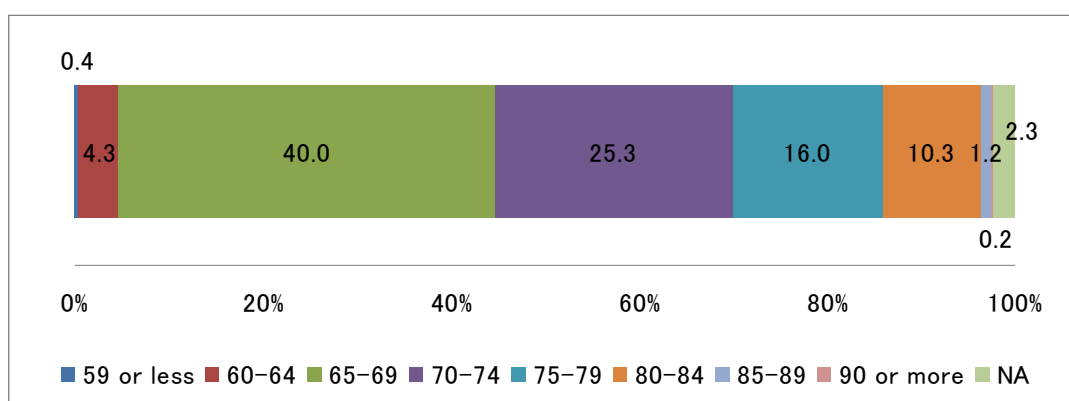


Figure 1. Respondent's age (N=486)

##### (2) Health condition and decline of ability

Health condition is important information for driving of seniors. Figure 2 shows self evaluation of respondent health condition. 67.5 % of respondent reported healthy, but 31.1 % was not good. According to national survey by Prime minister's office in 1996, 74 % of respondent reported healthy or ordinary. There was not a large difference between them. There were little decline of health as generation went up but the share by generation were almost the same.

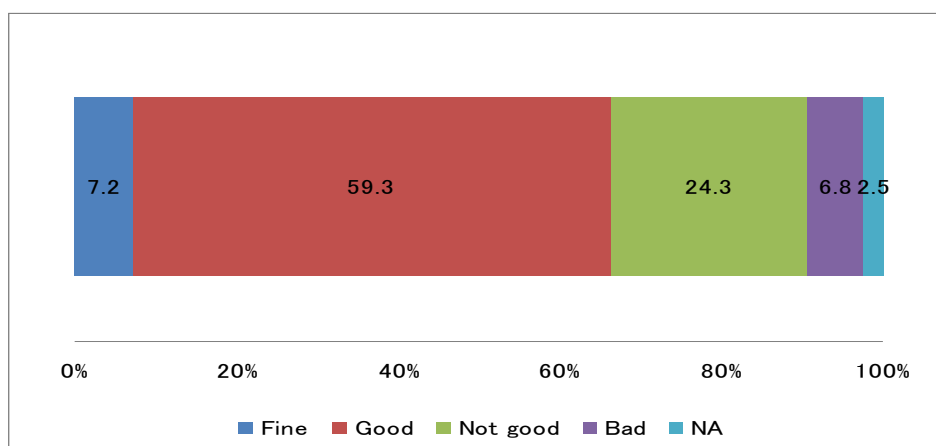


Figure 2. Self evaluation of health (N=475)

As one gets old, he loses ability due to the aging. Figure 3 shows the decline of ability by self evaluation. The respondents were able to choose more than one choices. Biggest share was physical strength 58.2%, followed by eyesight 50.4 %, quickness 40.1%, and memory 38.3 %. There was only 11.3 % who did not feel decline of own ability. These share increased as the generation went up.

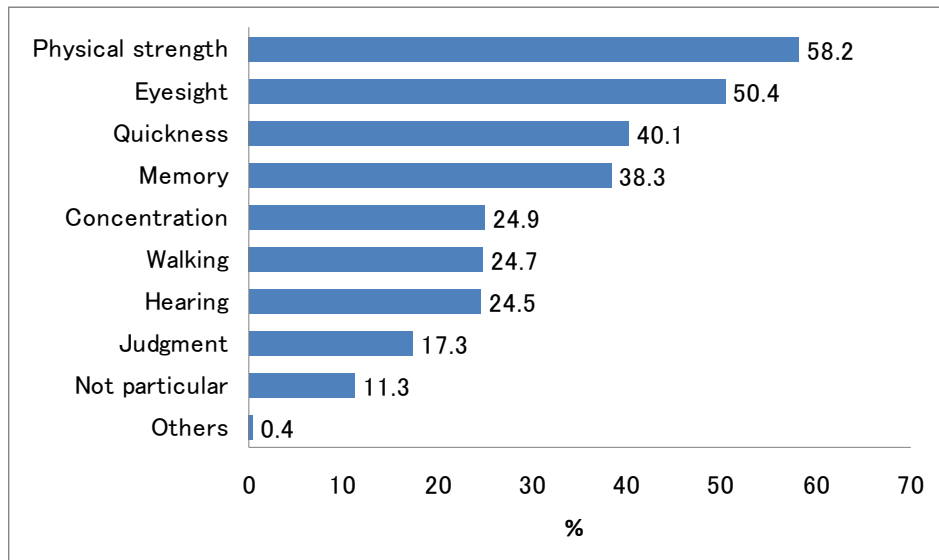


Figure 3. Decline of ability by self evaluation (N=486)

### (3) Frequency of Driving

Table 1 shows frequency of driving. Totally, 53.9% of respondents drive a car more than five days a week. According to the figure, frequency of driving declines age by age. However, it is remarkable that driver with age more than eighty years old, 40.4% of respondents still drive a car more than five days a week. Thus senior driver was active in general.

Table 1. Frequency of driving (% N=475)

	5 days or more a week	3-4 days a week	1-2 days a week	Few days a month	Few days a year
Total	53.9	29.2	12.8	3.5	0.6
60's or less	59.4	27.6	8.8	3.7	0.5
70's	51.7	30.3	14.4	3	0.5
80's or more	40.4	31.6	21.1	5.3	1.8

### (4) Purpose and reason of driving

Main purpose of driving was shopping 39.9%, commuting/business 22.2%, transport of family 9.7%, going to hospital 9.1% and so on. Reason of driving was 'convenient than public transportation ' 55.0%, 'transport of family ' 28.8%, 'no other means of transportation' 23.9%. Not a few respondents answered

transport of family as a reason of driving. It means that if the driver stops driving, not only driver himself but also his family will be affected.

#### **(5) Safety of driving**

To know the safety of driving, accident record in recent five years was asked. 17.7 % of respondent had experienced accident in last five years. There was not a large difference between generations.

This accident involved personal injury accident and property damage accident. The share of personal injury accident in the accident reported in this survey was 18.6 %. Therefore, totally 3.3 % of respondent experienced personal injury accident in last five years.

The government has only personal injury accident data. According to this, 1,451,376 persons were involved personal injury accident in 2006. While driver license holder was 79,907,000 persons. So probability to be involved in accident per driver license holder per year was 1.8%. Therefore probability to encounter accident at least once in five years (P) was calculated as follows.

$$P=1-(1-0.018)^5=0.087$$

Then, accident rate by this research was less than national average. Reliability of these data seemed to be not so high because accident data depends on memory of respondents. However, most of the family's answer about accident corresponded with driver's answer.

#### **(6) Weak point of driving**

Weak point of driving was asked. The biggest score was driving at night (58.2%). The second one was long driving (39.3%), the third one was back driving (38.1%). These results had connection with decline of ability because seniors felt decline of eyesight and physical strength mentioned before.

#### **(7) Driving feeling and willingness to stop driving in future**

Driving feeling and willingness to stop driving was researched. There were four choices that respondents chose.

- 1) Drive with pleasure, continue driving.
- 2) Drive with pleasure, but stop driving in few years
- 3) Drive with difficulty, so stop driving in few years
- 4) Drive with difficulty, but continue driving

Figure 4 shows the result classified by generation. Totally about 50% replied drive with pleasure and continue driving. There were only 5 % of respondents who chose drive with difficulty but continue driving. About 85% of respondents replied driving with pleasure. But as generation went up, share of 'drive with pleasure but stop driving in few years' increased. This may due to decline of physical ability which was mentioned before.

Figure 5 shows driver's will to stop driving in future. The question in Figure 4 was stop driving will in near future (few years). Here, question was stop driving will in future. Totally, about two third of respondent thought stop driving in future. Ratio of stop driving increased as generation went up. For

example, respondent whose age was 80 years or more, 86 % will stop driving in future. Thus in short range of time, senior driver wants to continue driving, but in long range of time, he wants to stop driving. As for the respondent who replied to stop driving in future, the imagined age of stop driving was asked. Figure 6 shows accumulated rate of imagined age when seniors would stop driving (driving retirement age). In this figure, former stage of elderly (65 to 74 years old) group and latter stage of elderly (75 years or more) group showed different curve. As for former stage of elderly, 90% will stop at the age of 76 to 80, but as for latter stage of elderly, 90 % will stop at the age of 86 to 90. There were very few people who would continue driving beyond 90 years old.

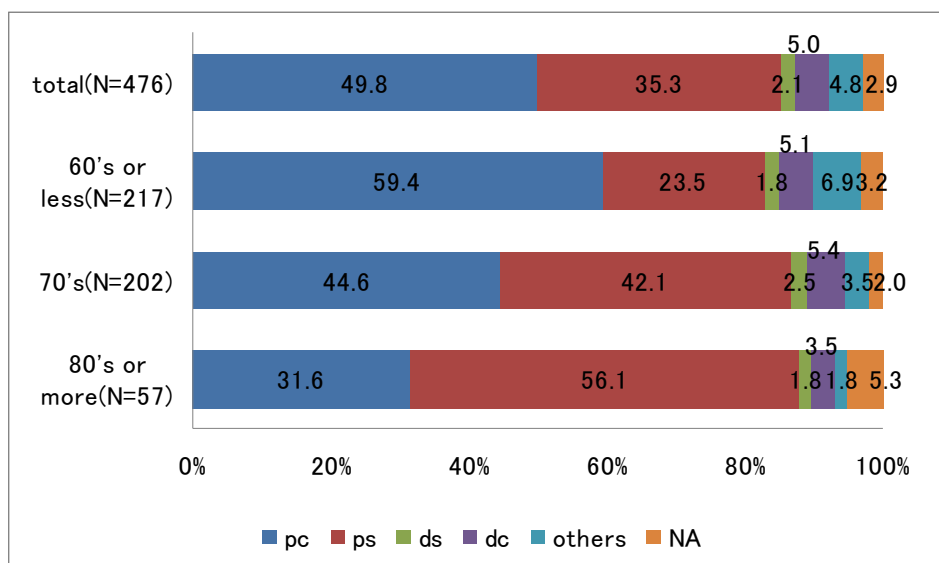


Figure 4. Driving feeling and willingness to stop driving (Legend pc: pleasure driving, continue driving ps: pleasure driving, but stop driving in few years ds: difficult driving, stop driving in few years dc: difficult driving, but continue driving)

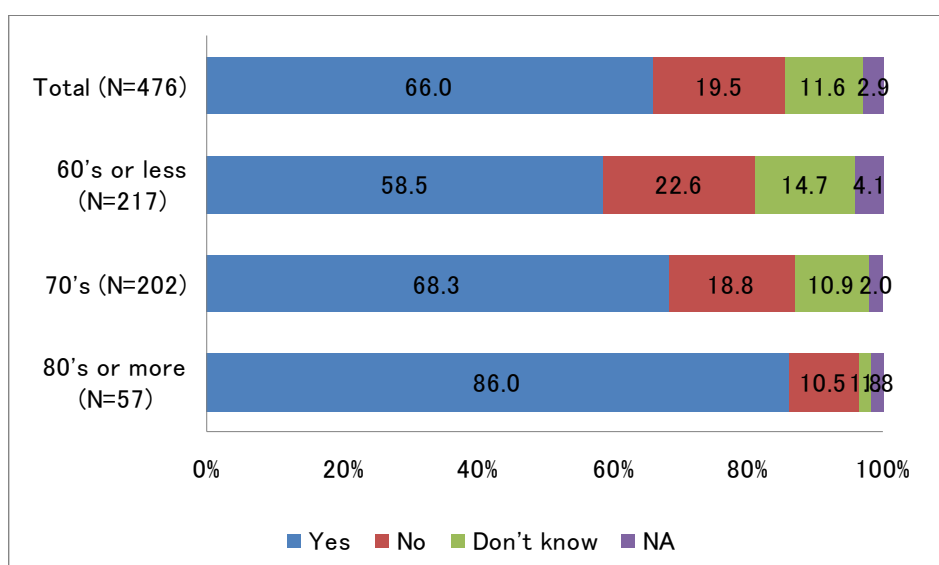


Figure 5. Driver's will to stop driving in future

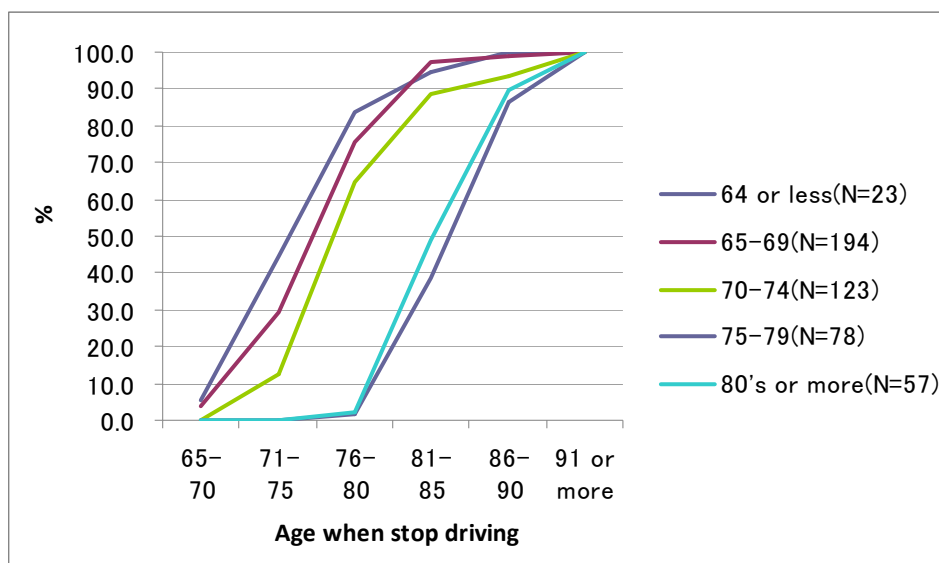


Figure 6. Accumulated percentage of driving retirement age

#### (8) Anxious of life after stop driving

Assuming driver had to stop driving, anxiety of life was asked. Totally 61.4% of respondent replied they felt anxiety of life (Figure 7). But those who did not use own vehicle as main transportation showed lower rate of anxiety. It means transportation was one of the biggest factors which supported senior's life. Same question was asked to the family who lived with senior driver. Figure 8 shows anxiety of family after senior family stopped driving classified by degree of dependence of transportation by senior driver. It is clear that if family depends on senior driver's transportation, he or she will get in trouble when the senior stopped driving. Stop driving will affect not only driver himself but also the family who depends on transportation by seniors.

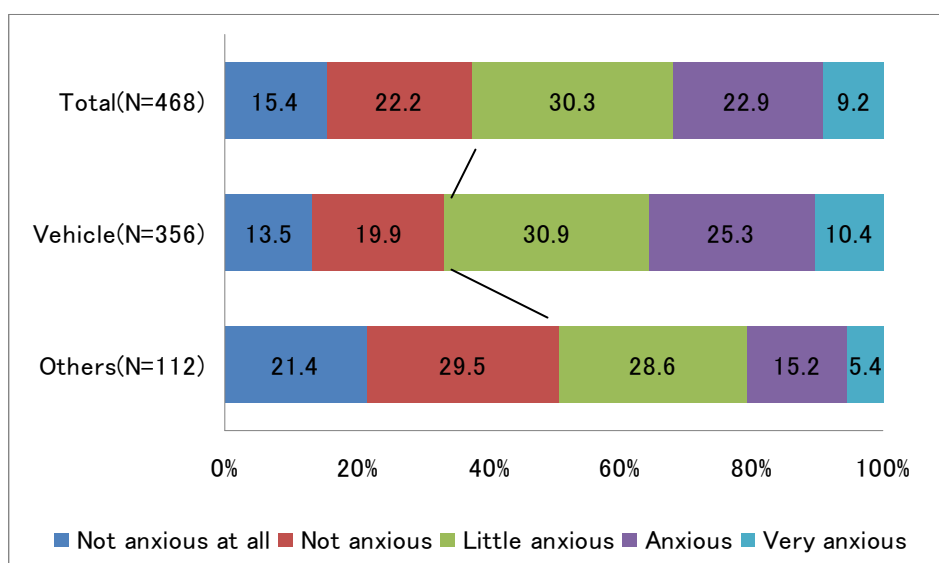


Figure 7 Anxiety of life after stop driving by main transportation

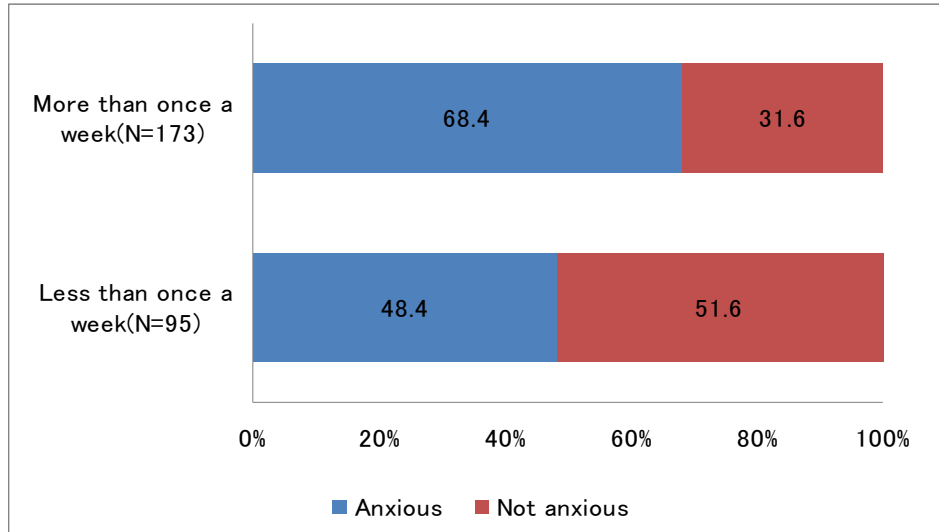


Figure 8. Family's anxiety of life after senior driver stops driving by dependence of transportation

Based on null hypothesis, Chi-square examination were applied to the data of Figure 7 and 8. Both null hypothesis were rejected at 1% significant level

#### (9) Alternative transportation and public transportation

If seniors stop driving, he has to use other means of transportation. Respondents were asked an alternative transportation which respondent imagined after stop driving. In this question, respondent were able to choose more than one choices. The biggest share was bus 55.9 % followed by taxi 47.8 %, walking 43.0 %, bicycle 30.5 %, and transport by family 16.9 % and so on. Therefore most common alternative transportation was bus.

Then the evaluation of bus is shown in Figure 9. The biggest dissatisfaction was low frequency of bus service. About 80 % of respondent was negative. Other dissatisfactions were complicated bus route, trouble of transfer and high fare.

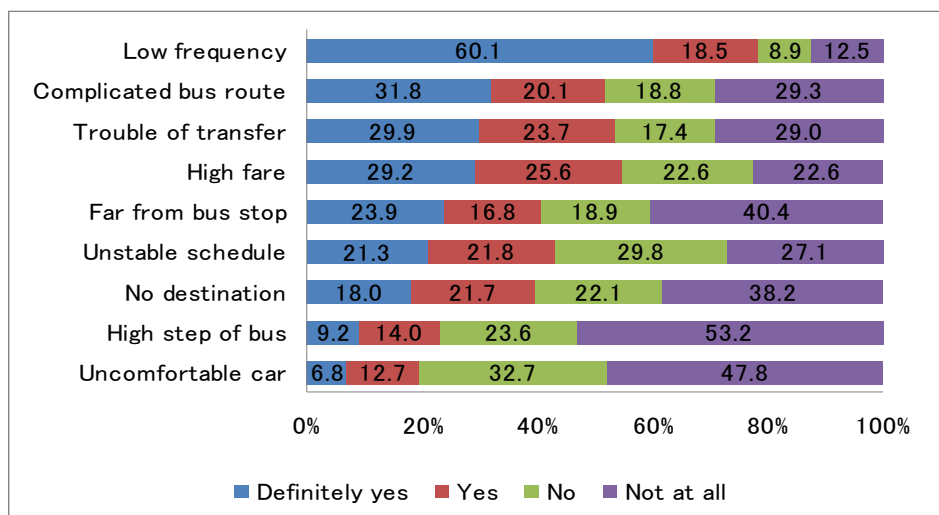


Figure 9. Dissatisfaction of bus services



#### **(10) Request of senior driver to improve transport condition**

Senior driver's request about improvement of transportation was asked. There were two kinds of improvement. One was to improve driving environment, the other was to improve alternative transportation. About former one, the senior driver requested enlargement of letter size of traffic sign 39.1%, untie a traffic jam 29.4%, widening of road 28.4% and so on. Enlargement of letter size had connection with decline of eyesight of senior people.

About latter one, improvement of public transportation had biggest score 54.5%. This result had connection with expectation and complaint of bus transportation. Second one was improvement of sidewalk 38.1%. On the contrary, mobile clinic 14.4%, mobile shop 12.1% had low score in spite of shopping and going hospital were major purpose of transport of senior people. It means senior people preferred to go out instead of staying at home.

#### **5. CONSIDERTTION AND CONCLUSION**

Following conclusions were obtained.

1. Even senior driver drove a car frequently. More than 40% of driver, whose age is over eighty, still drove a car more than five days a week.
2. Most of seniors felt decline of own ability such as physical strength and eyesight.
3. Weak point of senior driver was night drive and long drive.
4. Most of seniors drove with pleasure but imagine stop driving in future. About two third of respondent wanted to stop driving in future. This share increased as generation went up.
5. About 20% experienced accident in last five years.
6. Very few seniors wanted to drive a car beyond 90 years old.
7. About 60% of driver felt anxiety of life after retirement of driving.
8. Main alternative transportation after retirement of driving was bus transportation. However most of respondent felt dissatisfaction about bus services.
9. Improvement of public transport and road infrastructure was important for senior driver.

Senior drivers were active but felt decline of driving ability and health. Most of them imagine alternative transportation as bus. But bus service in rural area is not high. Therefore senior driver did not stop driving even though he wants to stop driving in future. It is necessary to improve bus system so as to meet senior's demand. But there are limitation of bus service in rural area due to low transportation demand and lack of subsidies from local governments. Then it is also important to sustain seniors driving safer. In this sense, improvement of road shall be considered as a one of means of senior transportation support.

## **ACKNOWLEDGEMENT**

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